

Claims

What is claimed is:

- [c1] A method of making fused silica, comprising:
generating a plasma;
delivering reactants comprising a silica precursor into the plasma to produce silica particles; and
depositing the silica particles on a deposition surface to form glass.
- [c2] The method of claim 1, wherein delivering reactants comprising a silica precursor into the flame further comprises delivering a dopant material into the plasma to form doped silica particles.
- [c3] The method of claim 2, wherein the dopant material comprises a compound capable of being converted to an oxide of at least one member of the group consisting of B, Al, Ge, K, Ca, Sn, Ti, P, Se, Er, and S.
- [c4] The method of claim 2, wherein the dopant material comprises a fluorine compound.
- [c5] The method of claim 4, wherein the fluorine compound is selected from the group consisting of CF_4 , $\text{CF}_x\text{Cl}_{4-x}$, where x ranges from 1 to 3, NF_3 , SF_6 , SiF_4 , C_2F_6 , and F_2 .
- [c6] The method of claim 1, wherein the plasma is generated by induction with a high frequency generator.
- [c7] The method of claim 1, wherein the silica precursor is substantially free of hydrogen.
- [c8] The method of claim 7, wherein the silica precursor comprises SiCl_4 .

- [c9] The method of claim 1, wherein the glass is formed in an enclosure having a water vapor content less than 1 ppm by volume.
- [c10] A method of making fluorine-doped glass, comprising:
generating a plasma;
delivering reactants comprising a silica precursor and a fluorine compound into the plasma to form fluorine-doped silica particles; and
depositing the fluorine-doped silica particles on a deposition surface to form glass.
- [c11] The method of claim 10, wherein the silica precursor and fluorine compound are delivered into the plasma in gaseous form.
- [c12] The method of claim 10, wherein the silica precursor is substantially free of hydrogen.
- [c13] The method of claim 12, wherein the silica precursor comprises SiCl_4 .
- [c14] The method of claim 10, wherein the fluorine compound is selected from the group consisting of CF_4 , $\text{CF}_x\text{Cl}_{4-x}$, where x ranges from 1 to 3, NF_3 , SF_6 , SiF_4 , C_2F_6 , and F_2 .
- [c15] The method of claim 10, wherein the glass is formed in an enclosure having a water vapor content less than 1 ppm by volume.
- [c16] A photomask material produced by a method comprising:
generating a plasma;
delivering reactants comprising a silica precursor into the plasma to form silica particles; and
depositing the silica particles on a deposition surface to form glass.
- [c17] The photomask material of claim 16, wherein the silica precursor is substantially free of hydrogen.
- [c18] The photomask material of claim 17, wherein the silica precursor comprises SiCl_4 .

- [c19] The photomask material of claim **16**, wherein the glass is formed in an enclosure having a water vapor content less than 1 ppm by volume.
- [c20] The photomask material of claim **16**, further comprising delivering a dopant material into the plasma to form doped silica particles.
- [c21] The photomask material of claim **20**, wherein the dopant material comprises a fluorine compound.
- [c22] The photomask material of claim **21**, wherein the fluorine compound is selected from the group consisting of CF_4 , $\text{CF}_x\text{Cl}_{4-x}$, where x ranges from 1 to 3, NF_3 , SF_6 , SiF_4 , C_2F_6 , and F_2 .
- [c23] A photomask for use at 157-nm comprising a silica glass made by plasma induction.